

IEEE Student Engineering Team Challenge (IEEE SETC) 2024

**JSPM's Bhivarabai Sawant Institute of Technology & Research,
Wagholi, Pune
Department of Electrical Engineering
(Accredited by NBA & NAAC "A+")**

WHEELCHAIR CUM BED USING JOYSTICK MECHANISM

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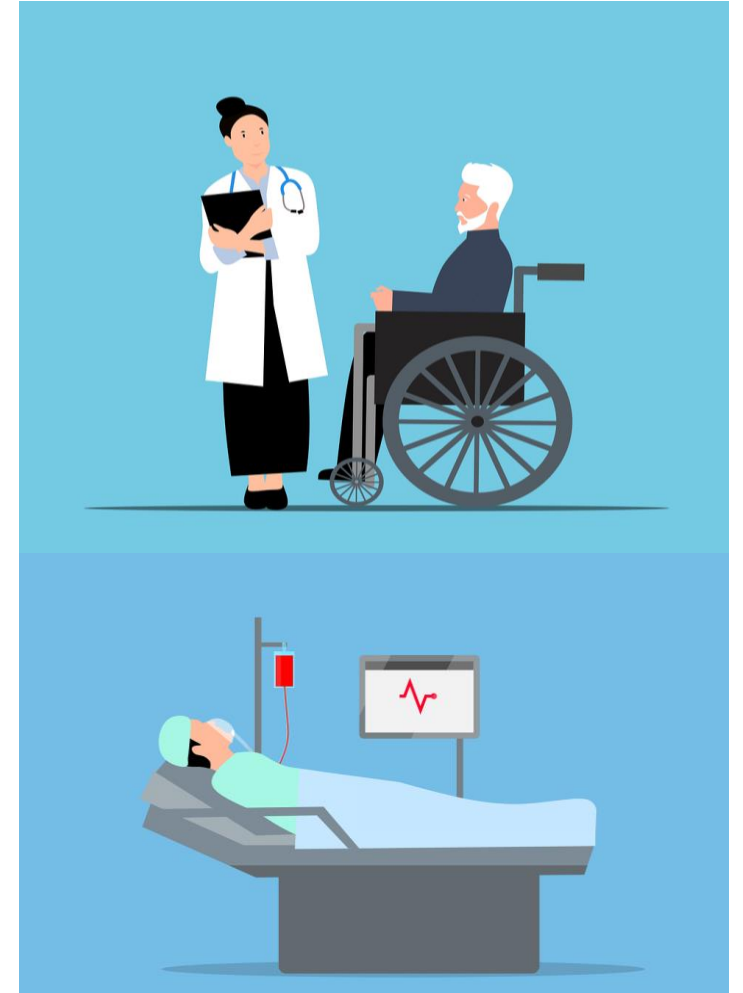
Project Guide : Ms.Pallavi Kamble

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INTRODUCTION

- Need for the Project
- We aim to create an intelligent and multifunctional model that seamlessly combines the features of a wheelchair and Bed.
- Integration of a Wiper Motor which provides precise and controlled movement
- Enhanced Patient Monitoring
- Safety Features



LITERATURE SURVEY

- As of last update in January 2022, there isn't a specific "wheelchair cum bed using joystick mechanism" that has gained widespread attention or extensive literature coverage. However, there have been advancements in both wheelchair and bed technology, as well as innovations in assistive devices for individuals with mobility impairments.
- MITRE Corporation Research (1994): Published theoretical modifications of manual wheelchairs for automation, with practical implementation in 1995.
- Taslima Reza's Electromyography Signal Research on Wheelchair(2012): Explored using EMG signals for wheelchair control, but practical implementation remains a challenge.
- Trivedi's Smart Wheelchair (2013): Developed a laptop-assembled wheelchair, but affordability remains an issue for many in developing countries.

PROBLEM STATEMENT

- **Immobility significantly affects both physical and mental health.**

Immobility can lead to physical problems like muscle weakness and pressure sores, as well as mental issues like depression and isolation."

- **Existing Challenges in Healthcare Transportation**

Traditional wheelchair and bed systems lack seamless integration and versatility. This results in inefficiencies and complications during patient transfer."

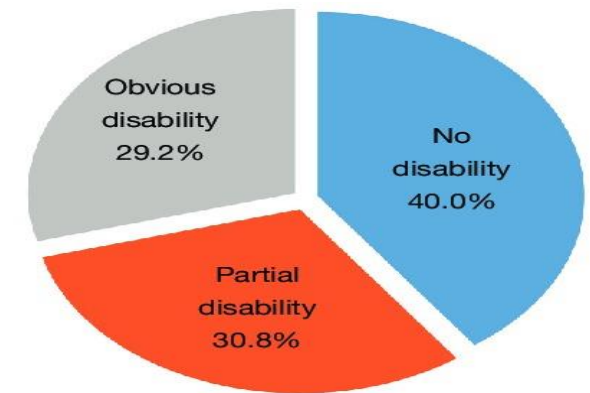
- **Need for Innovation**

There is a pressing need for a solution that combines the functionality of a wheelchair and bed while addressing the shortcomings of existing systems. Real-time health monitoring capabilities are essential for ensuring patient safety and well-being during transportation.



METHODOLOGY

- Concept of the wheelchair cum bed and its innovative features, such as the integrated wiper motor, heartbeat sensor, IR sensor, and buzzer, highlighting their importance in enhancing functionality, safety, and adaptability in healthcare transportation.
- Wiper motor was strategically employed for precise movement and actuator for seamless transitions between wheelchair and bed modes.
- Real-time health monitoring using heart rate sensor
- Featuring obstacle detection using IR sensor and Buzzer.
- Enhanced safety, transportation, and major impact on healthcare facilities.



BLOCK DIAGRAM

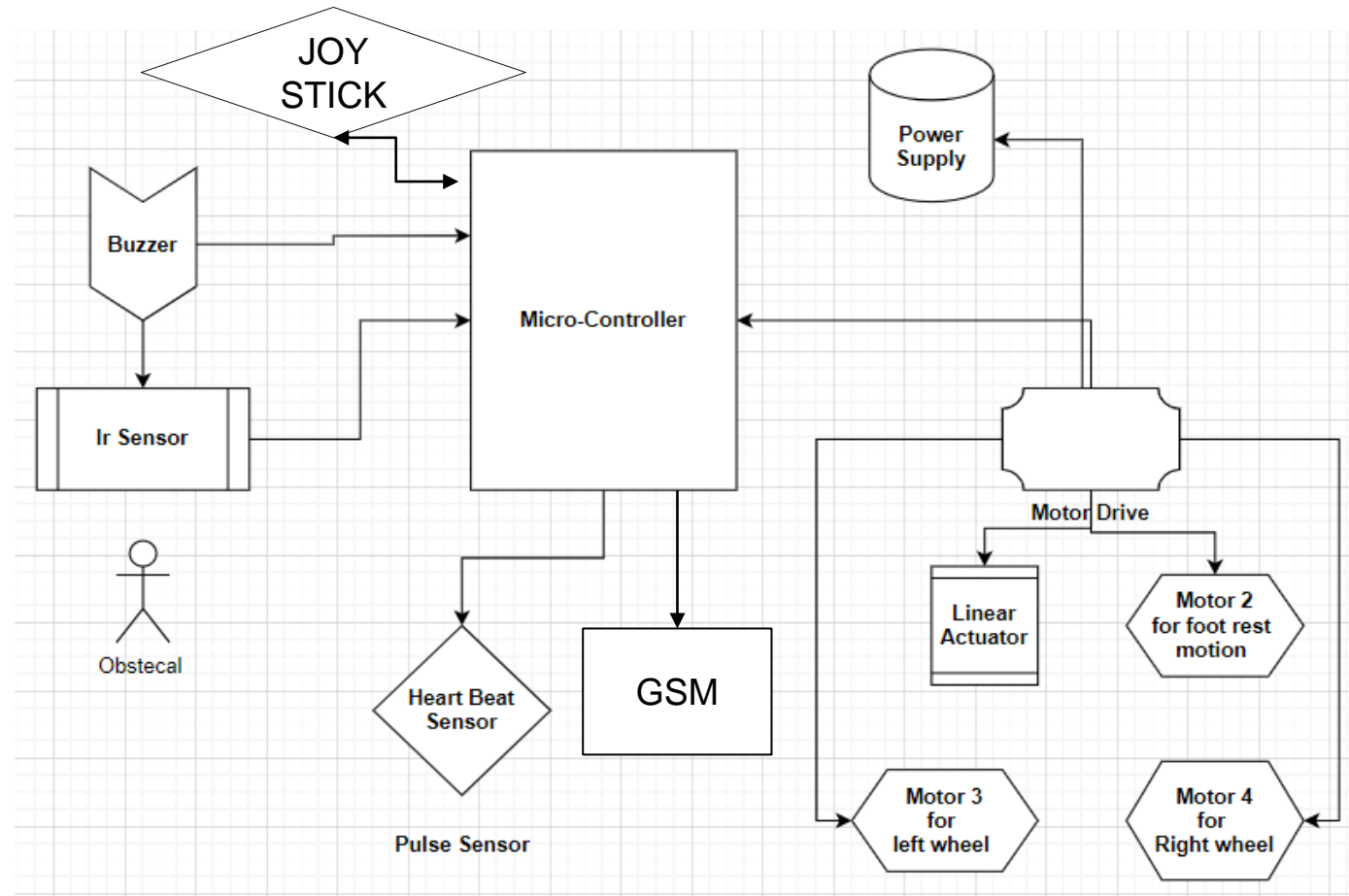


Fig. Block Diagram of Wheelchair Cum Bed Using Joystick Mechanism

COMPONANT USED



Joystick



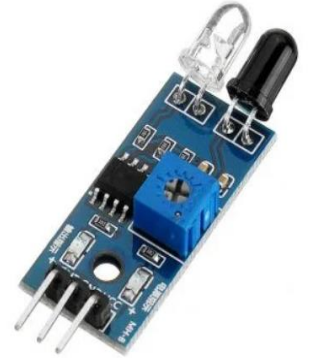
Wiper Motor



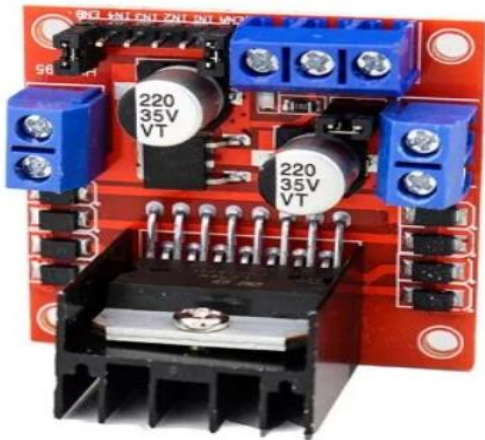
Actuator



GSM



IR sensor



Motor Driver



Arduino



Buzzer



Heart Beat Sensor



HARDWARE

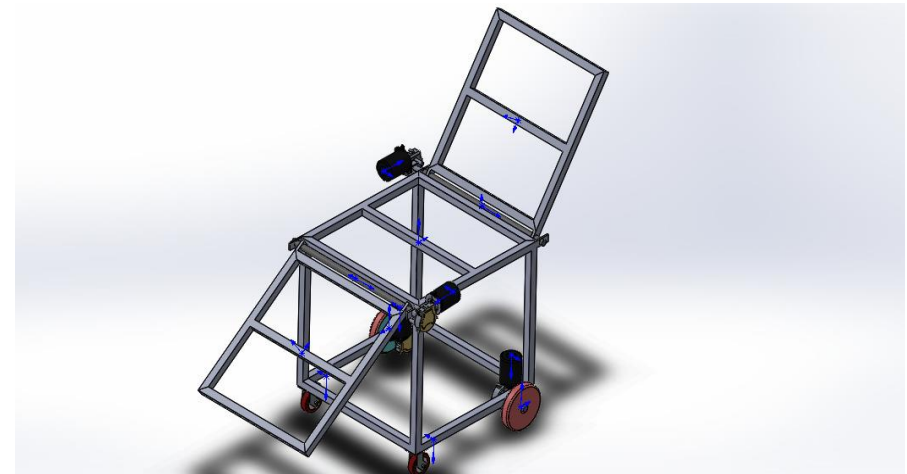
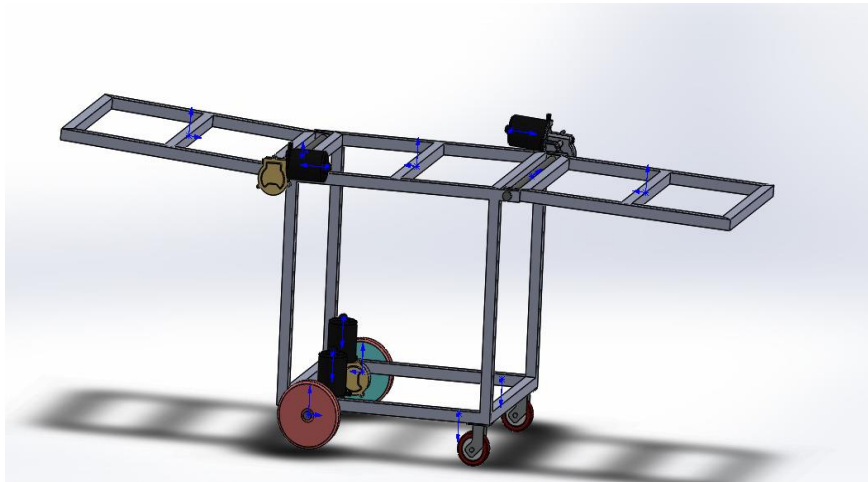


Fig 1: Wheelchair in Bed Mode



Fig 2: Wheelchair in Chair Mode

WORKING OF MODEL



ADVANTAGES TO SOCIETY

1. Enhanced Healthcare Accessibility
2. Improved Patient Health
3. Reduced Risks and Injuries
4. Empowerment of Caregivers
5. Promotion of Inclusive Healthcare Practices
6. Technological Advancement and Innovation
7. Positive Economic Impact

CONCLUSION

- **Adaptable and User-Friendly Solution:**
Integration of advanced technologies for a versatile medical mobility solution.
Seamless transition between wheelchair and bed modes enhances usability and adaptability.
- **Efficient Patient Transportation:**
Wiper motor facilitates smooth mode transitions, improving the efficiency of patient transportation in healthcare settings.
- **Real-Time Health Monitoring:**
Heartbeat sensor enables continuous health monitoring during transit, ensuring safer and more responsive patient care.
- **Enhanced Safety Features:**
IR sensor and buzzer provide obstacle detection and alerts, reducing collision risks and enhancing overall safety.
- **Benefits:**
Improved patient comfort and safety during transportation.
Increased efficiency for healthcare providers.
Elevated standard of safety in medical transportation scenarios.



FUTURE SCOPE

- **GPS Tracking**

- **Advanced Sensor Capabilities**

- **IoT and Connectivity**

- **Collaboration and Implementation:**

Partner with healthcare institutions and stakeholders to implement the device in real-world settings, gathering feedback for continuous improvement.

- **Regulatory Compliance:**

Work towards obtaining necessary certifications and approvals for medical device use, ensuring adherence to safety and quality standards.

- **Scalability and Market Expansion:**

Explore opportunities to scale up production and make the device accessible to a wider range of healthcare facilities and patients.

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PUBLISHED PAPER

1. Ms. Pallavi Kamble, Mr. Raj Divate, Ms. Ishika Kaur Sandhu, Mr. Brijesh Kandharkar, “**A Review on Wheelchair Cum Bed Using Joystick Mechanism**”, Paper Id: JBS/3474, ISSN NO: 1006-8341 , Volume 23, Issue 11, 2023.
2. Ms. Pallavi Kamble, Mr. Raj Divate, Ms. Ishika Kaur Sandhu, Mr. Brijesh Kandharkar, “**Wheelchair Cum Bed Using Joystick Mechanism**”, In the Proceedings THE INDIAN JOURNAL OF TECHNICAL EDUCATION, Volume 47 special issue no. 2 April 2024, ISSN 0971-3034

Work Done

Work Done	Completed By
Selection of topic	Raj Divate, Ishika Kaur Sandhu
Problem Statement	Brijesh Kandharkar
Literature Review	By all Members
Preparation of Block Diagram	Raj Divate, Ishika Kaur Sandhu
Calculation for components selection	Raj Divate, Brijesh Kandharkar
Purchasing of components	Brijesh Kandharkar
Assembly of Component	Brijesh Kandharkar
Testing of Component	Raj Divate, Ishika Kaur Sandhu
Perform model Testing	Ishika Kaur Sandhu
Result Analysis	By all Members

Thank you...